

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554**

Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Services

3-61

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**Before the
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In the Matter of)	
)	
Amendment of Part 90 of the)	
Commission's Rules to Adopt)	PR Docket No. 93-61
Regulations for Automatic)	
Vehicle Monitoring Services)	

PETITION FOR PARTIAL CLARIFICATION AND RECONSIDERATION

Pursuant to Section 1.429 of the Commission's Rules, 47 C.F.R. § 1.429, AMTECH Corporation ("AMTECH"),¹ by its attorneys, hereby respectfully seeks partial clarification and/or reconsideration of the Federal Communications Commission's Report and Order ("*Order*") adopted February 3, 1995, in the above-captioned proceeding.²

I. INTRODUCTION AND SUMMARY

AMTECH generally applauds the Commission's efforts to create a more definite regulatory structure for automatic vehicle monitoring ("AVM") licensees and equipment manufacturers using the 902-928 MHz band to provide Location and Monitoring Services ("LMS"). The new rules represent a significant step toward modernization of

¹ AMTECH, a worldwide leader in the manufacturing of non-multilateration AVM devices for transportation applications, has been an active participant throughout the course of PR Docket 93-61.

² *Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems*, Report and Order, PR Docket No. 93-61, FCC 95-41 (Feb. 3, 1995) [hereinafter "*Order*"].

the regulatory environment in which AMTECH products operate. By and large, the new rules will also accommodate the vehicle monitoring technologies that are currently in use and are likely to be deployed for the foreseeable future.

AMTECH believes, however, that certain rules adopted in the *Order* unnecessarily restrict the operational flexibility of non-multilateration LMS licensees. Because these regulatory constraints may unjustifiably inhibit the growth and development of non-multilateration LMS operations in the near as well as the long term, AMTECH requests the Commission to clarify or reconsider the rules applicable to non-multilateration systems in the following respects:

- to permit grandfathered non-multilateration LMS systems to continue to operate indefinitely in accordance with the previous AVM technical rules except in cases of actual harmful interference;
- to give non-multilateration LMS licensees flexibility to exceed either the height or power limits adopted in the *Order*, provided that certain field strength limits are met, and to impose more appropriate frequency tolerance and out-of-band emission limits on non-multilateration LMS operations;
- to require type-acceptance for transmitters imported or *manufactured* on or after a date certain;
- in view of AMTECH's request for reconsideration of the power, height, frequency tolerance, and out-of-band emission limits adopted in the *Order*, to delay the deadline for the need to type-accept equipment until a date 12 months after the Commission resolves the petitions for reconsideration in this proceeding;
- to allow non-multilateration LMS systems access to 14 MHz of contiguous spectrum by permitting them to

operate in the 921.75-923.75 MHz band on a shared basis with multilateration systems, in addition to the allocation made in the *Order*; and

- to make clear that multilateration and non-multilateration LMS licensees operating in sub-bands where shared operation is permitted will share the spectrum pursuant to the guidelines set forth in Section 90.173(b) of the Commission's Rules.

AMTECH submits that by clarifying or revising its rules in these respects, the Commission will strike the most efficacious balance between its interest in promoting the continued development of a diverse and competitive LMS industry and its obligation to ensure that all operations in the 902-928 MHz band are able to flourish on an interference-free basis.

II. THE COMMISSION SHOULD PERMIT GRANDFATHERED NON-MULTILATERATION SYSTEMS TO CONTINUE TO OPERATE INDEFINITELY IN ACCORDANCE WITH THE PREVIOUS AVM TECHNICAL RULES EXCEPT IN CASES OF ACTUAL HARMFUL INTERFERENCE.

In accordance with the rules and policies adopted in the *Order*, non-multilateration systems licensed under the interim AVM rules may operate equipment that complies with the interim rules until April 1, 1998.³ The only exception would be that equipment imported or marketed on or after April 1, 1996, must be type-

³ *Order* at ¶ 70; 47 C.F.R. 90.363(e). See also Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, Erratum, PR Docket No. 93-61, at ¶¶ 3, 10 (correcting ¶ 70 of the *Order* and Section 90.363(e)) (Feb. 17, 1995).

accepted.⁴ On or before April 1, 1998, non-multilateration licensees authorized under the interim rules must modify their licenses to specify operation solely in the 902-904 MHz and 909.75-921.75 MHz bands and to operate their systems consistent with the technical rules adopted in the *Order*.⁵ Because the Commission is permitting these "grandfathered" non-multilateration licensees to continue using non-type-accepted equipment indefinitely -- provided that the equipment was imported or marketed prior to April 1, 1996⁶ -- it is logical, from the standpoint of alleviating unnecessary

⁴ 47 C.F.R. § 90.203(b)(7), as amended by Appendix A of the *Order*.

⁵ *Order* at ¶ 70; 47 C.F.R. § 90.363(e). See also *Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems*, Erratum, PR Docket No. 93-61, at ¶¶ 3, 10 (correcting ¶ 70 of the *Order* and Section 90.363(e)) (Feb. 17, 1995).

⁶ AMTECH understands, based on the plain language of the new rules and the *Order*, that the type-acceptance rules do not preclude the operation, by grandfathered non-multilateration licensees, of non-type-accepted equipment beyond April 1, 1998, provided that such equipment is *not* imported or marketed after April 1, 1996. See *Order* at ¶ 88; 47 C.F.R. § 90.203(b)(7), as amended by Appendix A of the *Order*. Absent the rule modifications requested by AMTECH herein, however, such a licensee would be obligated to ensure that its equipment meets the Commission's other new LMS rules on or after April 1, 1998.

To the extent that the recent letter written by the Commission staff suggests to the contrary -- *i.e.*, that non-type-accepted equipment may not be used after April 1, 1998, *regardless of when it is imported, manufactured, or marketed* -- AMTECH requests confirmation from the Commission that AMTECH's understanding of the plain language of the new rules is correct or, in the alternative, reconsideration of the new rule. See Letter from Rosalind K. Allen, Acting Chief, Commercial Radio Division, Wireless Telecommunications Bureau, Federal Communications Commission, to George Y. Wheeler, Esq., Reference No. 7300-01/2000C (dated March 22, 1995). To require equipment that has been in the field for several years to be type-accepted retroactively when the licensee is already under an obligation to meet certain frequency

(continued...)

regulatory burdens, for the agency also to permit these licensees to continue operating in accordance with the technical requirements specified in the interim rules, provided that no actual harmful interference occurs. Accordingly, AMTECH asks the Commission to modify its rules to permit such operation.

Moreover, the Commission's decision to require each and every non-multilateration LMS system currently licensed and operating in accordance with the interim AVM rules to relocate to the 902-904 MHz and 909.75-921.75 MHz bands and to comply with the new rules by April 1, 1998, -- irrespective of the existence or likelihood of actual interference -- is unnecessarily burdensome and overbroad. Over 3,000 AMTECH-equipped transmitters are now in operation, almost all between 904-

⁶(...continued)

stability and emission mask requirements would impose an additional regulatory burden -- much of it falling on small businesses -- that is not outweighed by any tangible public interest benefit. Significantly, the reconsideration that AMTECH here requests in the alternative is consistent with prior Commission action. For example, in its 1974 rule making concerning the establishment of type-acceptance requirements for radiolocation equipment, the Commission initially decided that all radiolocation equipment used subsequent to January 1, 1974, would be required to be type-accepted. Thereafter, on its own motion, the Commission amended this requirement to exempt previously authorized radiolocation licensees, thus allowing stations authorized prior to January 1, 1974, to continue indefinitely to use non-type accepted equipment. In taking this action, the Commission explicitly acknowledged that this was the preferable course because it would "ease the equipment conversion problems and would be in the public interest." *Amendment of Sections 89.117(b) and 93.109(b) to Clarify Language in Part 93 to Specify a New Type Acceptance Date for Radiolocation Equipment*, FCC 74-144, 29 RR2d 753, 754 (1974) (Order). *See also Amendment of Parts 2 and 78 of the Commission's Rules and regulations to Expand the Frequencies Available for use by Cable Television Relay Service Stations*, FCC 80-604, 82 FCC 2d 354, 360-61 (1980) (Second Report and Order) (allowing the use of non-type-accepted equipment manufactured and/or marketed under prior standards to continue being used by licensees, provided that it does not cause interference).

912 MHz and 918-926 MHz.⁷ Many of these readers transmit on frequencies below 909.75 MHz and above 921.75 MHz. The forced relocation of these systems regardless of whether they pose an interference threat will be extremely costly and highly disruptive to the operations of affected non-multilateration licensees, many of which are state and local government agencies.⁸

Furthermore, because a significant number of these affected systems are installed in rural areas, it is unlikely that multilateration system sites will be installed within close proximity any time soon, if ever.⁹ As such, at least in rural areas, there is little likelihood that an existing non-multilateration system will cause interference to a multilateration system. Similarly, the mandatory relocation of non-multilateration systems fails to take into account either the evidence in the record or the findings in the

⁷ See Comments of AMTECH Corporation, PR Docket No. 93-61, at 36-37 n. 69. Relocation of these systems would require actual physical removal of all AMTECH-equipped transmitters and their replacement with transmitters that operate at different frequencies. In addition to the actual hardware costs of securing and implementing new or refurbished transmitters, licensees would be required to incur labor costs associated with the removal, replacement, and reinstallation of the transmitters. In many areas where AMTECH systems are currently in operation -- particularly in rural areas remote from the licensees' hub of commercial operations -- labor costs alone are likely to be extremely high.

⁸ *Id.* See also Comments of AMTECH Corporation on *Ex Parte* Presentations, PR Docket No. 93-61, at 12 (filed March 15, 1994).

⁹ This is particularly true in light of the fact that MTA LMS licensees are required only to construct a sufficient number of base stations using multilateration technology to provide multilateration location service to a substantial portion of only one BTA in that MTA. See *Order* at ¶ 60.

Order acknowledging that sharing between non-multilateration and multilateration systems is practicable on a height/power spatial diversity basis.¹⁰

In view of the above, AMTECH submits that a more equitable approach -- and one more closely tailored to cases involving actual interference -- would be to allow existing non-multilateration systems to continue operating at their current frequency locations indefinitely unless these licensees cause actual harmful interference to multilateration or non-multilateration licensees operating in the same bands.¹¹ Upon a legitimate complaint of harmful interference by an LMS licensee, the "culprit" non-multilateration system would be required to move and/or to comply with the Commission's new technical requirements, as necessary, to eliminate the harmful interference.¹² Consistent with prior precedent, such action should occur at the expense of the complaining licensee.¹³ By proceeding in this manner, the

¹⁰ See *infra* pages 19-20.

¹¹ As discussed at pages 22-23, *infra*, prior to April 1, 1998, these licensees operating in new multilateration bands share the spectrum in accordance with Section 90.173(b). It is only after April 1, 1998, that the grandfathered non-multilateration licensee's operations would be conditioned on a lack of interference.

¹² For example, if the non-multilateration licensee need only lower its power to eliminate the harmful interference, it may choose to do so and need not relocate to another frequency or otherwise comply with the other new technical rules.

¹³ As noted in AMTECH's comments filed in response to the Commission's Notice of Proposed Rule Making in this proceeding, in other cases of forced migration, the Commission has generally required the beneficiary to reimburse the relocated licensee for the reasonable direct costs incurred in making the move. See Comments of AMTECH Corporation, PR Docket No. 93-61, at 38 (filed June 29, 1993). See also *Redevelopment of Spectrum To Encourage Innovation in the Use of New*

(continued...)

Commission will ensure that LMS systems operating in spectrum outside the non-multilateration allocations are able to function effectively. At the same time, this approach will impose a burden on non-multilateration licensees that is only as great as necessary to guarantee the integrity of multilateration LMS operations. The public interest benefits from such an arrangement -- specifically, furtherance of the most effective use of the spectrum resource and minimization of unnecessary regulatory burdens -- are obvious.

¹³(...continued)

Telecommunications Technologies, ET Docket No. 92-9, 7 FCC Rcd 6886, 6890 (1992) (First Report and Order and Third Notice of Proposed Rule Making) (emerging technology service provider ("ETS") must reimburse all relocation expenses of any microwave licensee forced to move out of its current spectrum on the ETS provider's behalf); *Amendment of the Commission's Rules To Allocate Spectrum For, and To Establish Other Rules Pertaining To a Radiodetermination Satellite Service*, GEN Docket No. 84-689, 58 RR2d 1416, 1421 (1985) (Report and Order) (RDSS licensees required to pay reasonable and prudent costs of existing grandfathered mobile operations involuntarily moved to alleviate interference), *clarified*, 104 FCC 2d 637 (1986). Similarly, in its Further Notice of Proposed Rule Making considering the implementation of a framework for the licensing of 800 MHz Specialized Mobile Radio ("SMR") systems on a wide-area basis, the Commission proposed that, if mandatory retuning is required, the wide-area licensee will be required to, *inter alia*, "guarantee payment of all relocation expenses, including all engineering, equipment, site, and regulatory fees, as well as any reasonable additional costs that the relocated licensee may incur" *Amendment of Part 90 of the Commission's Rules to Facilitate Future Development of SMR Systems in the 800 MHz Frequency Band*, Further Notice of Proposed Rule Making, FCC 94-271, at ¶ 32 (Nov. 4, 1994).

III. THE COMMISSION SHOULD REVISE THE TECHNICAL REQUIREMENTS APPLICABLE TO NON-MULTILATERATION SYSTEMS TO GIVE NON-MULTILATERATION LICENSEES MORE OPERATIONAL FLEXIBILITY.

As explained below, the height, power, frequency tolerance, and out-of-band emission requirements adopted in the *Order* for non-multilateration LMS licensees are unnecessarily restrictive. These rules have the potential to constrain the legitimate operations of non-multilateration licensees without producing any corresponding benefit in terms of interference control. AMTECH believes that the Commission did not intend such a result. Accordingly, AMTECH seeks reconsideration of these limits, and requests the Commission to modify its rules to preserve the operational flexibility of non-multilateration LMS applications in accordance with the suggestions delineated below.¹⁴

A. Height and Power. The Commission limited the peak ERP of non-multilateration systems to 30 watts over the licensee's authorized bandwidth, and restricted the antenna height above ground of these systems to 15 meters.¹⁵ The

¹⁴ AMTECH also requests reconsideration of the new rules to permit intermittent operation of portable readers that do not comply with the new frequency stability and emission mask requirements, provided that such readers operate at less than 10 watts ERP and with an emission mask of $43 + 10 \log(P)$ dB as set forth in 47 C.F.R. § 90.209(c)(1)(iii). These readers operate only when a momentary switch is depressed and typically are used to validate the tag on a rail car after the tag is installed or for troubleshooting during maintenance. Accordingly, the interference potential of these operations is very low.

¹⁵ *Order* at ¶ 93. See also *Amendment of Part 90 of the Commission's*
(continued...)

stated rationale for reducing the maximum power and antenna height of non-multilateration systems was that it would "allow non-multilateration systems to share spectrum more easily with other non-multilateration systems and with users of Part 15 devices and will permit greater frequency reuse for these systems."¹⁶

The following examples illustrate why the 15-meter height limitation is likely to be overly restrictive as applied to the operations of non-multilateration LMS systems. As the Commission is aware, AMTECH installations are used by airport authorities to monitor and identify taxis and other commercial ground transportation services that use the arriving and departing ramps. The antennas for readers that monitor the activity of AMTECH tags in corresponding vehicles may be placed at locations fewer than 15 meters above the ramp but more than 15 meters above the *ground*. Similarly, a reader located on an overhead gantry above a highway ramp or other elevated roadway may be more than 15 meters above the *ground*. Likewise, intermodal containers are often transported from ships or other transportation devices by use of crane. The crane typically houses the transmitter used to locate and monitor articles being transported, often at a point 30 meters or more above the *ground*. Notably, because overhead installations housing an AMTECH reader typically do not radiate toward the horizon,

¹⁵(...continued)

Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, Erratum, PR Docket No. 93-61, at ¶ 4 (correcting ¶ 93 of the *Order*) (Feb. 17, 1995).

¹⁶ *Order* at ¶ 93.

they do not pose a significant potential for interference despite the fact that they may be more than 15 meters above the *ground*.¹⁷

In other instances, the 30 watt ERP limit adopted in the *Order* unnecessarily restricts the users of non-multilateration systems. For instance, the monitoring of rail cars in high-speed multiple track situations requires the use of non-conventional antennas. Between closely-spaced rail tracks, safety regulations limit the region for mounting structures, including antennas, to very close to the ground. At high rail car speeds, an antenna with an extended near field pattern is required, which results in a high gain in the far field. This antenna is mounted on the ground and pointed upward at an angle of about 45 degrees. The extended near field zone results in an antenna gain higher than normally used in other applications. The radiated power near the ground at some distance from the antenna is, however, very much reduced. Away from the antenna and at a height of two meters, the power generated by this antenna is reduced by 50 dB from what an antenna of equivalent gain would produce if the antenna were mounted at a height of 15 meters.¹⁸ Thus, the unconditional limit of 30 watts ERP is overly restrictive.¹⁹

¹⁷ These readers generally employ antennas that are canted downward (often directly toward the ground).

¹⁸ K. Bullington, *Radio Propagation for Vehicular Communications*, IEEE Transp. Veh. Technol., Vol. VT-26, No. 4, at 295-308 (Nov. 1977).

¹⁹ AMTECH assumes that the ERP is calculated by multiplying the maximum far-field antenna gain by the transmitter output power.

Although AMTECH is sensitive to the Commission's concerns about congestion in affected bands, the foregoing discussion demonstrates that there are legitimate applications for non-multilateration LMS systems that require an antenna height in excess of 15 meters or an ERP exceeding 30 watts.²⁰ To accommodate the Commission's concerns while at the same time allowing sufficient flexibility to encompass these operations, AMTECH urges the Commission to permit licensing of non-multilateration services in excess of the limits adopted in the *Order*, pursuant to the following restrictions.

First, AMTECH proposes that if the product of transmitter output power and maximum antenna gain of a non-multilateration system exceeds 30 watts ERP, the resultant radiated electric field be limited to 90 dBuV/m at a distance of one mile from the site and at a height of six feet (or 96 dBuV/m at one kilometer and a receive height of two meters). Compliance with this requirement could be demonstrated by calculation or on-site measurements.²¹

²⁰ In recognition of the fact that non-multilateration systems may require flexibility to exceed any set antenna height limit, Hughes Aircraft Company, in its June 29, 1993, comments, proposed a "sliding scale," that would limit local-area LMS transmitters with up to a 5 watt ERP at 25-40 meters above ground and 1 watt ERP above 40 meters. Comments of Hughes Aircraft Company, PR Docket No. 93-61, at 8-9 (filed June 29, 1993). AMTECH mentions this not necessarily as an endorsement of Hughes's suggestion, but to note concurrence with regard to the need for an antenna height greater than 15 meters.

²¹ Such a requirement would result in a field strength equivalent to that which would be produced by a facility operating at 30 watts ERP from a height of 15 meters above ground.

Second, AMTECH suggests that if the antenna height exceeds 15 meters, the maximum ERP be limited to 30 watts and the energy radiated toward the horizon be reduced such that the resultant radiated electric field be limited to 90 dBuV/m at a distance of one mile from the site and at a height of six feet. On-site measurements would be required to demonstrate compliance if the antenna height exceeds 15 meters.

B. Frequency Tolerance. In addition, AMTECH asks the Commission to reconsider the 0.00025 percent frequency tolerance limit adopted for multilateration and non-multilateration systems.²² Frequency tolerance limits are generally designed to ensure the stability of carrier frequencies and to minimize adjacent channel interference by requiring a licensee to maintain its system's energy within an assigned slot. Where there is no channelization, as is the case at 902-928 MHz, imposition of frequency tolerance limits serves little purpose toward protection against interference. Accordingly, in bands with no channelization, a particularly strong case could be made for maximizing technical flexibility by refraining from imposing frequency tolerance limits, provided that the applicable out-of-band emission limits are satisfied.²³

²² Order at ¶ 91.

²³ See, e.g., 47 C.F.R. § 24.235 (the frequency stability should be sufficient to ensure that the fundamental emission stays within the authorized frequency band); 47 C.F.R. § 90.645(f); see also *Amendment of Part 90 of the Commission's Rules to Release Spectrum in the 806-821/851-866 MHz Bands and to Adopt Rules and Regulations Which Govern Their Use*, PR Docket No. 79-191, 90 FCC 2d 1281, 1326-27 (1982) (Second Report and Order).

In light of the above, it appears that the Commission's decision to impose frequency tolerance limits in the 902-928 MHz band is premised on the desire to protect against any potential for interference resulting to systems operating close to the band edge. In AMTECH's view, this concern can be accommodated without imposing unnecessary restraints on non-multilateration LMS systems' operational flexibility if the 0.00025 percent frequency tolerance limit is applied only to those systems with center frequencies located within a distance, D , from the band edge, where $D = 0.5(\text{authorized bandwidth}) + 40 \text{ kHz}$. Systems operating at a distance equal to or greater than D from the band edge should only be required to comply with a frequency tolerance of $\pm 40 \text{ kHz}$.

C. Out-of-Band Emissions. Paragraph 98 of the *Order* indicates that LMS licensees will be required to attenuate their emissions by $55 + 10 \log(P)$ dB at the edges of specified LMS sub-bands. Section 90.209(c)(1)(iii) of the Commission's Rules, 47 C.F.R. § 90.209(c)(1)(iii), sets forth the general land mobile attenuation requirements for out-of-band limitations on radiated signals, which is $43 + 10 \log(P)$. Although not a requirement of the interim AVM rules, using good engineering practices, equipment developed for licensing under Part 90 rules would normally be devised to comply with Section 90.209(c)(1)(iii). Many filings have shown that sharing of the 902-928 MHz band under the interim rules was possible, and thus, that overly restrictive out-of-band limitations are not necessary. Accordingly, AMTECH recommends that non-multilateration LMS systems be subject to the general

requirement in Section 90.209(c)(1)(iii) for transmitter output power of two watts or less.

IV. IN VIEW OF AMTECH'S REQUEST FOR RECONSIDERATION OF THE TECHNICAL LIMITS ADOPTED IN THE ORDER, THE COMMISSION SHOULD DELAY THE DEADLINE FOR THE NEED TO TYPE-ACCEPT EQUIPMENT.

The Commission's new rules require all LMS equipment "imported or marketed" after April 1, 1996, to be type-accepted for use under Part 90.²⁴ As discussed in the prior section of this pleading, AMTECH is seeking reconsideration of the height, power, frequency tolerance, and out-of-band emission requirements adopted for non-multilateration LMS systems. It is likely that AMTECH's request for reconsideration will remain pending for at least several months, leaving a cloud of uncertainty with respect to the technical requirements that will ultimately be applied to non-multilateration systems. The fact that there are good reasons to change some or all of these requirements on reconsideration creates the distinct possibility that any efforts to comply in the interim with the rules adopted in the *Order* will prove to have been unnecessary. Thus, AMTECH urges the Commission to delay the type-acceptance date at least until 12 months after final technical requirements have been adopted.

Furthermore, the Commission's current requirement that LMS equipment "imported or *marketed*" after the specified date must be type-accepted exacerbates the

²⁴ *Order* at ¶ 88.

uncertainty plaguing manufacturers because a "marketed" condition could actually work to prevent equipment manufacturers from dispensing with inventory that was *manufactured* prior to the cut-off date in accordance with the then-applicable rules.²⁵

To help rectify this problem, AMTECH urges the Commission to revise Section 90.203 to require LMS equipment *imported or domestically manufactured* after the date when type-acceptance is ultimately required to obtain type-acceptance approval. A clarification to this effect will add meaning to the transition period that the Commission presumably intended to afford equipment manufacturers in order to permit them to develop new designs compliant with the tighter technical requirements and to dispense with inventory manufactured in accordance with the prior rules.²⁶ In addition, the requested clarification will help minimize the economic dislocations associated with the imposition of a more restrictive regulatory scheme and would be more consistent with the approach followed by the Commission in other similar contexts.²⁷ Thus, to

²⁵ Marketing includes sale, or lease, offers for sale or lease (including advertising for sale or lease), and importation, shipment, or distribution for the purpose of sale or lease or offering for sale or lease. See 47 C.F.R. §§ 2.802, 2.895; see also *Revision of Part 2 of the Commission's Rules Relating to The Marketing and Authorization of Frequency Devices*, ET Docket No. 94-45, 9 FCC Rcd 2702 n.4 (1994) (Notice of Proposed Rule Making).

²⁶ Order at ¶ 88.

²⁷ See, e.g., *Revision of Part 15 of The Rules Regarding The Operation of Radio Frequency Devices Without an Individual License*, GEN Docket No. 87-389, 4 FCC Rcd 3493, 3518-19 (1989) (First Report and Order) (creating a transition period for equipment "imported or domestically manufactured"); see also *Amendment of Parts 2 and 78 of the Commission's Rules and Regulations to Expand the Frequencies* (continued...)

summarize, AMTECH petitions the Commission to revise Section 90.203(b)(7) to refer to "[t]ransmitters imported or manufactured before [insert date reflecting the twelve-month anniversary of the effective date of the *Order* resolving the petitions for reconsideration and adopting final technical requirements] for use by LMS systems."

V. THE COMMISSION SHOULD MODIFY ITS SPECTRUM ALLOCATION PLAN TO ALLOW NON-MULTILATERATION SYSTEMS TO OPERATE IN 14 MHz OF CONTIGUOUS SPECTRUM.

The Commission's spectrum allocation plan for the 902-928 MHz band provides non-multilateration systems a total of 14 MHz of spectrum. Of this, 12 MHz of contiguous spectrum at 909.75-921.75 MHz is available for non-multilateration system use.²⁸ The upper 2 MHz of this sub-band, 919.75-921.75 MHz, is available on a shared basis with multilateration systems.²⁹

The 12 MHz of contiguous spectrum made available to non-multilateration licensees under the new allocation scheme affords these systems access to the absolute minimum amount of spectrum required for the operation of new, high-data, applications

²⁷(...continued)

Available for use by Cable Television Relay Service Stations, FCC 80-604, 82 FCC 2d 354, 360-61 (1980) (Second Report and Order) (allowing non-type accepted equipment manufactured and/or marketed before a one-year cut-off date to be marketed for an additional four years to allow depletion of existing inventories and permitting licensees to continue to use non-type accepted equipment indefinitely as long as it does not cause interference); *see also* 47 C.F.R. § 15.37 (delineating the schedule for use, manufacturing, and importation of Part 15 equipment).

²⁸ *Order* at ¶¶ 47-49.

²⁹ *Id.*

such as those being implemented by the California Department of Transportation ("Caltrans") and the Kansas Turnpike authority.³⁰ Theoretically, these advanced non-multilateration systems will be able to operate effectively using 12 MHz of contiguous spectrum. If situations arise, however, as they likely will, requiring a non-multilateration licensee to shift the center frequency of the tag reader in order to respond to interference or to facilitate the mutual resolution of any incompatibilities, the new band plan will make it difficult, if not impossible, to do so because the allocation scheme leaves non-multilateration licensees no flexibility other than to overlap partially one signal onto another.³¹

³⁰ See *Order* at 25 n.98. See also Letter from David E. Hilliard, Esq., to William Caton, Acting Secretary, Federal Communications Commission, at 1-2 (dated Aug. 12, 1994). The read-write technology used in these systems requires a 6 MHz wide channel. Two 6 MHz wide channels can usually accommodate most toll environments because these systems use very high speed signalling, which lends itself to time-multiplexing across multiple lanes. Because the 12 MHz is to be shared with other LMS systems and occupied by other users, such as amateurs and Part 15 devices, it is also preferable to provide some room within a given sub-band to shift the center frequency of the tag reader so as to facilitate the mutual resolution of any incompatibilities. *Id.*

³¹ Non-multilateration systems can operate in the near vicinity of other non-multilateration systems by using time or frequency multiplexing. Degradation of performance results if channel-to-channel spacing is less than some value. The minimum required channel spacing for the present high-data rate systems to avoid significant signal degradation, if collocated, is 6 MHz. The radiated bandwidth of these systems is also 6 MHz. Thus, the minimum contiguous spectrum required is 12 MHz. The few isolated prior instances of interference involving AMTECH have been resolved by changing the frequency of the AMTECH transmitter. Thus, under the band plan adopted in the *Order*, and for two channels (which are required from an operational standpoint), the non-multilateration frequency cannot be changed to solve an interference problem without degrading the performance of the non-multilateration

(continued...)

To provide non-multilateration LMS licensees a necessary additional resource of contiguous spectrum, AMTECH requests the Commission to modify the adopted band plan to allow non-multilateration LMS systems access to 14 MHz of contiguous spectrum, specifically, 909.75-923.75 MHz. Of this, a total of 4 MHz -- 919.75-923.75 MHz -- would be shared with multilateration systems.

The Commission specifically found in the *Order* that multilateration and non-multilateration LMS systems can cooperate and share. In particular, as mentioned, the Commission's allocation plan provides for the two system types to share the 919.75-921.75 MHz band (sub-band D).³² In addition, the Commission has implicitly acknowledged the feasibility of sharing throughout the entire 902-928 MHz band by requiring that, in order to become grandfathered, multilateration systems must begin operating before April 1, 1996. These systems will be required to share with non-multilateration systems licensed under the interim rules at least until April 1, 1998.³³

³¹(...continued)
system. Limiting the authorized sub-band for non-multilateration systems to the minimum theoretically necessary does not allow the flexibility to use the techniques proven to work to date to resolve interference problems that arise in the future.

³² *Order* at ¶¶ 47-49.

³³ *Id.* at ¶ 63-64. AMTECH has consistently explained that the co-existence of multilateration and non-multilateration systems is feasible and practical. *See, e.g.*, Comments of AMTECH Corporation, PR Docket No. 93-61, at 20-24 (filed June 29, 1993) (discussing the workability of sharing between these two types of systems generally); Reply Comments of AMTECH Corporation to Comments on *Ex Parte* Presentations, PR Docket No. 93-61, at 5-7 (filed March 29, 1994) (discussing the successful shared operation of Pinpoint's multilateration system and AMTECH's
(continued...)

Further, multilateration systems constructed on or before February 3, 1995, may continue to operate on existing frequencies until April 1, 1998.³⁴ These systems may, in fact, operate in frequencies used by both grandfathered non-multilateration systems as well as those occupied by non-multilateration systems operating within the new non-multilateration allocation. The record fully supports the Commission's finding that sharing between non-multilateration and multilateration systems is workable.³⁵

AMTECH submits that multilateration systems operating in the frequencies AMTECH asks the Commission to add to the non-multilateration allocation will not

³³(...continued)
non-multilateration system during a joint test conducted in the summer and fall of 1993).

³⁴ *Order* at ¶ 63.

³⁵ A number of commenters responding to the Commission's Notice of Proposed Rule Making acknowledged the feasibility of multilateration/non-multilateration sharing in all or part of the AVM allocation. *See, e.g.*, Comments of Pinpoint Communications, Inc., PR Docket No. 93-61, at 9-10 (filed June 29, 1993); Comments of American Tel. & Tel. Co., PR Docket No. 93-61, at 8 (filed June 29, 1993); Comments of Mark IV IVHS Division, PR Docket No. 93-61, at 4 (filed June 29, 1993); Reply Comments of Southwestern Bell Mobile Systems, Inc., at Appendix B, pp. 4-5 (filed March 29, 1994); Comments of North American Teletrac and Location Technologies, Inc., PR Docket No. 93-61, at Appendix 2 (filed June 29, 1993); Comments of the Association of American Railroads, PR Docket No. 93-61, at 6-7 (filed June 29, 1993); Comments of the American Trucking Ass'n, PR Docket No. 93-61, at 2 (filed June 29, 1993); Comments of the Greater New Orleans Expressway Commission, PR Docket No. 93-61, at 1 (filed June 24, 1993); Comments of the N.J. Highway Authority, the N.J. Turnpike Auth., the N.Y. State Thruway Auth., the Pa. Turnpike Commission, the Port of N.Y. & N.J., the South Jersey Transp. Auth. and the Triborough Bridge & Tunnel Auth. ("IAG"), PR Docket No. 93-61, at 9 (filed June 29, 1993); Comments of the American President Companies, Ltd., PR Docket No. 93-61, at 2 (filed June 29, 1993) (several commenters' positions on sharing are discussed in detail in AMTECH's July 29, 1993, Reply Comments filed in PR Docket No. 93-61).

appreciably increase the potential for interference. The 2 MHz of sub-band E (921.75-923.75 MHz) that AMTECH requests the Commission to make available for non-multilateration systems are part of a 5.5 MHz multilateration sub-band (921.75-927.25 MHz). The data in the record reflect that, as the bandwidth of a multilateration LMS system increases, the ability of affected licensees to operate effectively in a shared environment with non-multilateration systems also increases as a result of the concomitant increase in capacity and decrease in pulse duration.³⁶ Thus, multilateration systems operating at 921.75-927.25 MHz should be able to use shorter pulse duration than 2 MHz (or less) systems operating in sub-band D.³⁷ The net result is less potential for interference between non-multilateration and multilateration systems at 921.75-927.25 MHz than at 919.75-921.75 MHz as the potential for both the interferer and interfere to be operating simultaneously decreases. At bottom, AMTECH requests the Commission to permit non-multilateration licensees access to 2

³⁶ See Costas N. Georgiades, *On the Effect of Bandwidth on the Performance of AVM Systems Operating in the 902-928 MHz ISM Band* (Dec. 7, 1994) (at pages 5-6, Dr. Georgiades, Associate Professor in the Electrical Engineering Department of Texas A&M University, discusses the fact that, as bandwidth increases, pulse duration shortens, reducing the potential for interference). Dr. Georgiades's abstract was filed with the Commission for inclusion in the record of PR Docket No. 93-61. See Letter from David E. Hilliard, Esq., to William F. Caton, Acting Secretary, Federal Communications Commission (dated Dec. 7, 1994). See also Comments of North American Teletrac and Location Technologies, Inc., PR Docket No. 93-61, at 23 (filed June 29, 1993) (as bandwidth increases, there is an exponential increase in location capacity).

³⁷ Multilateration systems that combine sub-bands D and E for bandwidths in excess of 5.5 MHz should operate with even shorter pulses, thus making them even more compatible.

MHz of sub-band E (921.75-923.75 MHz), consistent with the Commission's finding that sharing between multilateration and non-multilateration operations is feasible at 919.75-921.75 MHz.

VI. THE COMMISSION SHOULD CLARIFY THAT MULTILATERATION AND NON-MULTILATERATION LMS SYSTEMS OPERATING IN SUB-BANDS WHERE SHARED OPERATION IS PERMITTED WILL SHARE PURSUANT TO THE GUIDELINES SET FORTH IN SECTION 90.173.

The Commission's new rules state that the 2 MHz of spectrum at 919.75-921.75 MHz are to be shared by non-multilateration and multilateration systems on a "co-equal" basis.³⁸ The new rules also provide that multilateration-MTA licensees and grandfathered AVM systems, including grandfathered *non-multilateration* licensees authorized on a shared basis must operate in accordance with the well-established sharing guidelines set forth in Section 90.173(b) of the Rules.³⁹

AMTECH believes that the Commission intended for *all* non-multilateration and multilateration systems sharing spectrum in the 902-928 MHz band to cooperate and share in accordance with Section 90.173(b).⁴⁰ Accordingly, AMTECH asks the

³⁸ 47 C.F.R. § 90.353(h); *see also Order* at ¶ 49.

³⁹ 47 C.F.R. § 90.353(e).

⁴⁰ Section 90.173(b), which governs shared land mobile frequency assignments, requires applicants and licensees to "cooperate in the selection and use of frequencies in order to reduce interference and to make the most effective use of . . . authorized facilities." In addition, the rule directs licensees suffering or causing harmful interference "to cooperate and resolve this problem by mutually satisfactory arrangements." If they are unable to do so, the Commission is charged with imposing restrictions aimed at curing the interference complained of. 47 C.F.R. § 90.173(b).

Commission to clarify that multilateration and non-multilateration systems operating on a "co-equal" basis in the 919.75-921.75 MHz band (and 921.75-923.75 MHz if the revisions recommended above are adopted) will share under the guidelines set forth in Section 90.173(b). Likewise, the Commission should clarify that any grandfathered *multilateration* system permitted to operate outside the new multilateration sub-bands through April 1, 1998, pursuant to Section 90.363(c) will share with non-multilateration systems on the same terms.

VII. CONCLUSION

For the foregoing reasons, AMTECH respectfully requests the Commission to clarify and/or modify the rules adopted in the *Order* applicable to non-multilateration LMS systems. Adoption of the clarifications and revisions suggested by AMTECH will increase the operational flexibility of non-multilateration system operators, which will in turn serve the public interest by promoting the competitive viability of these